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FIG.12

ENTRY

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING \$300 MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME 1.

DETERMINE INITIAL CANDIDATES (Pb22_s, θ b22_s) of 2ND Provisional Corrected Body Position/Posture according to the following expressions on the Basis of 2ND Provisional Corrected Body Position Pb22_p and Desired Body Position Pb_p at last time 1- \triangle 1, and desired Body Position Pb and Desired Body Posture θ b at current time 1.

 $Pb22_s = Pb + (Pb22_p - Pb_p)$

 θ b22 s= θ b

S306

S302

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb22_s, θ b22_s) and desired positions/postures of both feet at current time 1.

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR L_err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL.

S308

S310 yes

LEAVE REPETITION LOOP.

S312

IS L_err WITHIN PERMISSIBLE RANGE? <

S314

 ∞

S304

DETERMINE A PLURALITY OF CANDIDATES (Pb22_s+ \triangle Pb22x, θ b22_s) AND (Pb22_s+ \triangle Pb22z, θ b22_s) NEAR (Pb22_s, θ b22_s), Then use them as 2ND provisional corrected body position/posture candidates to determine angular momentum product error as described above.

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb22_s, θ b22_s) and candidates in the vicinity thereof, determine new 2nd provisional corrected body position/posture candidates (Pb22_s, θ b22_s) so as to approximate the error to zero. However, θ b22_s is not changed.

S316

SUBSTITUTE CURRENT (Pb22_s, θ b22_s) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE (Pb22, θ b22) AT CURRENT TIME t.

S318

RETURN

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FIG.24

ENTRY

\$600

S602

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME t.

DETERMINE INITIAL CANDIDATES (Pb22_s, θ b22_s) of 2ND Provisional Corrected Body Position/Posture according to the following expressions on the basis of 2ND Provisional Corrected Body Position Pb22_p and desired Body Position Pb_p at Last time t- \triangle t, and desired Body Position Pb, desired Body Posture θ b, 1st Provisional Corrected Body Posture θ b21 and Weights w1, w2 at current time t. Pb22_s = Pb + (Pb22_p—Pb_p)

 θ b22 s= w1 * θ b21 + w2 * θ b

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb22_s, θ b22_s) AND DESIRED POSITIONS/POSTURES OF BOTH FEET AT CURRENT TIME t.

S606

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR L_err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL.

\$608

S610 yes

LEAVE REPETITION LOOP.

S612

S604 IS L_err WITHIN PERMISSIBLE RANGE?

 ∞

S614

DETERMINE A PLURALITY OF CANDIDATES (Pb22_s+ \triangle Pb22x, θ b22_s) and (Pb22_s+ \triangle Pb22z, θ b22_s) near (Pb22_s, θ b22_s), then use them as 2nd provisional corrected body position/posture candidates to determine angular momentum product error as described above.

S616

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb22_s, θ b22_s) and candidates in the vicinity thereof, determine New 2nd provisional corrected body position/posture candidates (pb22_s, θ b22_s) so as to approximate the error to zero. However, θ b22_s is not changed.

SUBSTITUTE CURRENT (Pb22_s, θ b22_s) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE (Pb22, θ b22) AT CURRENT TIME t.

S618

RETURN

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FIG.12

ENTRY

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING \$300 MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME 1.

DETERMINE INITIAL CANDIDATES (Pb22_s, θ b22_s) of 2ND provisional corrected BODY Position/Posture according to the following expressions on the basis of 2ND provisional corrected body position Pb22_p and desired body Position Pb_p at last time t- Δ t, and desired body position Pb and desired BODY Posture θ b at current time t.

 $Pb22_s = Pb + (Pb22_p - Pb_p)$

 θ b22 s= θ b

S306

S302

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb22_s, θ b22_s) and desired positions/postures of both feet at current time t.

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR L_err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL

S308

S310 yes

LEAVE REPETITION LOOP.

S312

IS L_err WITHIN PERMISSIBLE RANGE? <

 ∞

S314

S316

DETERMINE A PLURALITY OF CANDIDATES (Pb22_s+ \triangle Pb22x, θ b22_s) and (Pb2)_s+ \triangle Pb22z, θ b22_s) near (Pb22_s, θ b22_s), then use them as 2nd provisional Corrected Body Position/Posture candidates to determine angular momentum product error as described above.

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb22_s, θ b22_s) AND CANDIDATES IN THE VICINITY THEREOF, DETERMINE NEW 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES (Pb22_s, θ b22_s) so as to approximate the Error to Zero. However, θ b22_s is not changed.

SUBSTITUTE CURRENT (Pb22_s, θ b22_s) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE (Pb22, θ b22) at current time t.

S318

RETURN

P622

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FIG.24

ENTRY

\$600

S602

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME 1.

DETERMINE INITIAL CANDIDATES (Pb22_s, θ b22_s) OF 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF 2ND PROVISIONAL CORRECTED BODY POSITION Pb22_p and desired body position Pb_p at LAST TIME 1- \triangle 1, and desired body position Pb, desired body posture θ b, 1ST PROVISIONAL CORRECTED BODY POSTURE θ b21 and weights w1, w2 at current time 1. Pb22_s = Pb + (Pb22_p-Pb_p)

 θ b22 s= w1 * θ b21 + w2 * θ b

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb22_s, θ b22_s) and desired Positions/Postures of both feet at current time 1.

\$606

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR L_err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL.

\$608

S610 yes

LEAVE REPETITION LOOP.

\$612

S604 IS L_err WITHIN PERMISSIBLE RANGE?

S614

5616

 ∞

DETERMINE A PLURALITY OF CANDIDATES (Pb22_s+ \triangle Pb22x, θ b22_s) and Pb22y_s+ \triangle Pb22z, θ b22_s) near (Pb22_s, θ b22_s), then use them as 2nd provisional corrected body position/posture candidates to determine angular momentum product error as described above.

Pb 22

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb22_s, θ b22_s) and Candidates in the vicinity thereof, determine new 2nd provisional corrected body Position/Posture Candidates (Pb22_s, θ b22_s) so as to approximate the error to zero. However, θ b22_s is not changed.

SUBSTITUTE CURRENT (Pb22_s, θ b22_s) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE (Pb22, θ b22) at current time 1.

S618

RETURN